

ABSTRACT OF THE DISCLOSURE

An improved method for controlling nucleation sites during superabrasive particle synthesis can provide high quality industrial superabrasive particles with high yield and a narrow size distribution. The synthesis method can include forming a raw material layer, forming a particulate catalyst layer adjacent the raw material layer, and placing crystalline seeds in a predetermined pattern at least partially in the catalyst layer or raw material layer to form a growth precursor. Alternatively, the raw material and catalyst material can be mixed to form a particulate crystal growth layer and then placing the crystalline seeds in a predetermined pattern in the growth layer. Preferably, seeds can be substantially surrounded by catalyst material. The growth precursor can be maintained at a temperature and pressure at which the superabrasive crystal is thermodynamically stable for a time sufficient for a desired degree of growth. The crystalline seeds can be placed in a predetermined pattern using a template, a transfer sheet, vacuum chuck or similar techniques. The superabrasive particles grown using the described methods typically have a high yield of high quality industrial particles and a narrow distribution of particle sizes.

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